

## A CLUB HEAD FOR A GOLFING PUTTER

The invention relates to a club head for a golfing putter, more particularly a putter head which is wing-shaped, seen from above, and exhibits a large moment of inertia about a horizontal axis (z-axis) and about a vertical axis (x-axis) through the mass centre of the putter relative to the mass of the club head. This means reduced loss in speed and direction if the golf ball is hit by the putter outside the putter's "sweet spot" (the point on the striking face located on the line of movement of the centre of gravity of the club head). The invention also relates to stabilizing aids for the wings of the club head and aiming aids integrated in the club head.

Conventional putters are designed as "heel/toe-weighted" or with a so-called "mallet" shape.

Heel/toe-weighted putters have a large moment of inertia about the x-axis, thereby giving little loss in speed and direction in horizontal mishits. On the other hand, the moment of inertia about the z-axis is low, so that the loss in speed in vertical mishits will be large.

Mallet putters have a relatively large moment of inertia about the z-axis, and the loss in speed in vertical mishits

is relatively small. On the other hand, the moment of inertia about the x-axis is relatively small, so that the loss in speed and direction in horizontal mishits is relatively large.

- 5 US patent application 2003/013546 A1 discloses a wing-shaped putter head with toe and heel wings projecting rearwards in diverging directions from the face. The mass centre has been given a favourable position in that recesses in the body of the putter head are filled with a lighter material,  
10 preferably an elastomer like polyurethane.

US patent 6270422 B1 discloses a putter with detachable heel and toe wings, in which, on a top surface of each of the wings and on the club head, are placed aiming aids in the form of line markings in the surfaces located in a horizontal  
15 plane perpendicular to the face of the club head.

US patent 5470070 discloses a T-shaped putter head with aiming lines placed in an upper club surface and placed in a horizontal plane perpendicular to the face of the club head.

WO publication 01/91860 A1 discloses a symmetrical putter  
20 head suitable for both right-handed and left-handed players, in which aiming lines are placed in the upper surface of the club head.

It is of great importance for the striking properties of a putter club that in the moment of striking, the position of  
25 the club head is affected to the least possible degree by the collision with the ball. In the ideal stroke the putter hits the ball on the sweet spot. The effective mass moving in the stroke is not just the club head, but also parts of the shaft. The sweet spot (centre of rotation) of a shafted club  
30 is located higher than the sweet spot (centre of gravity) of the club head alone. In practice, most putters have the sweet

spot higher than the centre of the striking face. Most players hit the ball with the striking face centre. Thus, it is beneficial to move club head mass down, so that the real sweet spot of the club is lowered towards the centre of the striking face.

In addition, an important factor for good performances in putting is to be able to aim the putter at the right angle towards the target. To make the aiming easier, there are different designs, in which lines or circles on the club head, or the shape of the lower part of the shaft, form(s) virtual aiming line(s) assuming a direction perpendicular to the striking face of the putter, viewed from above.

The invention has as its object to remedy the drawbacks of the prior art.

The object is achieved through the features specified in the description below and in the following claims.

According to the prior art a club head for a putter has a wing shape, a toe wing extending rearwards from a toe portion of the club head and in a direction away from a striking face of a front portion of the club head, and a heel wing extending rearwards from a heel portion of the club head and in a direction away from the striking face of the club head. The outer side edges of the wings may have diverging directions, viewed from the striking face of the club head.

The club head is suitably provided with an essentially transversal connection bracing the wings and extending between the outer wing portions of the opposite wings, possibly as a connection between the outer wing portion of each wing and a front portion of the club head, possibly as a combination of the bracing methods mentioned.

The mass centre of the club head is located lower than the centre of the striking face. This is achieved by the wings advantageously having, in a front portion and a middle portion, an approximately L-shaped cross-section. Even other  
5 cross-sectional shapes that will give a predominant amount of mass in the lower portion of the wings can be used.

Alternatively, the position of the mass centre can be lowered by the use of a light material, for example aluminium, in the upper portions of the club head, combined with a heavy  
10 material, for example tungsten, in the lower portions of the club head.

Towards the rear end portion of the wings, the thickness of the vertical wall increases, while at the same time, the width of the wings increases. Thereby much mass is also  
15 placed at the rear of the wings, so that the moment of inertia of the club head about a vertical axis through the sweet spot will be large.

The moment of inertia of the club head about the vertical axis can also be increased by use of a light material, for  
20 example aluminium, in the mid portions of the club head, combined with a heavy material, for example tungsten, in the outer portions of the club head. It is also favourable for the club head to exhibit a large moment of inertia about a horizontal transversal axis through the sweet spot. This is  
25 achieved by using a heavy material in the club head's rear and outer portions, that is to say, the furthest out in the wings, whereas a light material is used in the mid portions and front portions of the club head.

The lower, internal edge surfaces of the wings are parallel  
30 and at right angles to the striking face, viewed in a horizontal plane, thereby forming an aiming aid. Parallel to the lower, internal edge surfaces of the wings, the wings are

advantageously provided with an additional aiming aid in the form of aiming line markings.

Alternatively or in addition to the above-mentioned aiming aids, each of the wings may be provided with an aiming aid in the form of one or more aiming line markings on a wing top surface, the aiming line markings being, in a horizontal plane, at right angles to the face.

Alternatively, the club head may be provided with aiming aids placed on or integrated in the bracing connections between the wings and/or between the wings and the front portion of the club head.

The front portion of the club head comprises the striking face, the toe portion, the heel portion and a shaft-connecting portion.

In the shaft-connecting portion the front club portion advantageously has an L-shaped cross-section for the purpose of placing a predominant amount of mass in the lower portion of the club head. Alternatively the shaft-connecting portion has a cross-section approximating a lying U-shape, in which an upper side surface and a lower side surface are formed to provide a stable attachment for a shaft without a large club mass being placed in this area. The U-shaped shaft-connecting portion gradually merges into a cross-section of an approximate L-shape or other cross-sectional shape giving a predominant amount of mass in the lower portion of the club head.

In the transition between the toe portion and the toe wing, the heel portion and heel wing, respectively, the thickness of the vertical wall is suitably increased to provide sufficient stability for the wings.

The upper side surface of the front portion of the club head is suitably provided with an additional aiming aid in the form of an aiming line marking lying parallel to the striking face.

5 Similarly, the upper side surface of the shaft-connecting portion is suitably provided with one or more aiming aids in the form of one or more aiming line markings lying at right angles to the striking face. The aiming line marking(s) may advantageously be extended in a direction away from the  
10 striking face by the shaft-connecting portion comprising one or more projecting aiming pins. Advantageously, one of the aiming line markings of the shaft-connecting portion coincides with a vertical plane extending through the "sweet spot" of the club head.

15 The aiming line markings, besides those formed by the geometrical shape of the club head (side edges, aiming pin and similar), are formed by, for example, recesses, indentations, elevations, colour markings or similar.

In what follows is described a non-limiting example of a  
20 preferred embodiment which is visualized in the accompanying drawings, in which:

Figure 1 shows a principle drawing of a toe/heel-weighted club head, in a top plan view;

Figure 2 shows a principle drawing of a "mallet"-shaped club  
25 head, in a top plan view;

Figure 3 shows a perspective drawing of a wing-shaped club head according to the invention;

Figure 4 shows a front view of the club head;

Figure 5 shows a rear view of the club head;

Figure 6 shows a horizontal section VI-VI through the club head, seen from above as indicated in Figure 5;

Figure 7 shows a cross-section VII-VII through a club wing as  
5 indicated in Figure 6;

Figure 8 shows a side view of the club head;

Figure 9 shows a perspective drawing of an alternatively wing-shaped club head according to the invention;

Figure 10 shows a perspective drawing of a further  
10 alternatively wing-shaped club head according to the invention.

Figure 11 shows a top plan view of a further exemplary embodiment of a wing-shaped club head according to the invention;

15 Figure 12 shows a perspective drawing of the exemplary embodiment of Figure 11.

In figure 1 the reference numeral 1 indicates a club head with a tow/heel-weighted distribution of mass according to the prior art and with a toe portion 3, a heel portion 5, a  
20 striking face 7 and a connecting portion 9 for a shaft (not shown). An arrow S indicates the direction of stroke.

In figure 2, numeral 11 identifies a "mallet"-shaped club head according to the prior art. The other numbers have the same references as in Figure 1.

In figures 3-8 the reference numeral 21 indicates a wing-shaped club head with a toe portion 23, a heel portion 25, a striking face 27 and upper and lower connecting portions 29, 29' for a shaft (not shown). A toe wing 31 projects from the toe portion 23. A heel wing 31' projects from the heel portion 25.

Each wing 31, 31' includes a vertical sidewall 33 and an essentially horizontal bottom portion 35, together forming an approximately L-shaped cross-section. The vertical sidewall 33 is provided with an outer side surface 37. The bottom portion 35 is provided with an internal side edge 39 and an upper bottom surface 41. The upper bottom surface 41 is provided with a recessed aiming groove 43 lying parallel to and extending in approximately the entire length of the straight portion of the side edge 39. The rectilinear side edge portion 39 is advantageously at least 10 mm long. In a rear end portion 45 the cross-section of the wings 31, 31' gradually changes from an L-shape into a rectangular shape.

Each wing 31, 31' also includes a wing top surface 42, each provided with an aiming line marking 44. The aiming line markings 44 lie, in a horizontal plane, parallel to each other and parallel to the straight side edge 39 of the respective wing 31, 31'.

A front top surface 47 is provided with a recessed aiming groove 49, which lies parallel to the face 27.

The connecting portions 29, 29' are suitably provided with a hole 51, 51' for the insertion of the shaft (not shown).

The upper connecting portion 29 is provided with a recessed aiming groove 53, which is, in a horizontal plane, at right angles to the face 27 and is placed, in a vertical plane that is at right angles to the face 27 and extends through the



"sweet spot" of the club head. The aiming groove 53 is broken by the shaft hole 51.

Figure 9 shows an alternative embodiment of the club head 21, in which the aiming groove 53 is extended rearwards along an aiming pin 54.

Figure 10 shows a further embodiment of the club head 21, in which an intermediate plate 65 fills the space between the bottom portions 35 of the wings 31, 31'. An aiming line marking 67 in the upper surface 66 of the intermediate plate 65 is at right angles to the striking face 27.

Figures 11 and 12 show a further embodiment of the club head 21, in which the wings 31, 31' are interconnected by means of cross stays 71, 71', the cross stays 71, 71' projecting from the bottom portions 35 of the wings 31, 31'. The cross stays 71, 71' are connected by a stabilizing stay 73 to a mid portion 75. The stabilizing stay 73 is provided with rectilinear parallel side edge portions 77 that are at right angles to the striking face 27. A top surface 78 is provided with an aiming line marking 79.

The toe and heel portions 23, 25 separately have an approximately L-shaped cross-section, in which a lower front portion 55 projects essentially horizontally rearwards in a direction away from the striking face 27. The lower front portion 55 has a smooth transition into the lower connecting portion 29' for the shaft, alternatively into the mid portion 75 of the club head and the bottom portions 35 of the wings 31, 31'.

By means of the mass concentration of the projecting wings 31, 31' in their rear end portions 45, the club head 21 according to the invention exhibits a large moment of inertia.

The intermediate plate 65, alternatively the cross stays 71, 71', interconnect(s) the wings 31, 31' and brace(s) the wings 31, 31'. Thereby the natural oscillating frequency of the club head increases, resulting in a less audible sound  
5 produced by the club head's 21 impact on the ball in the moment of stroke. At the same time, the cross stays 71, 71' increase the mass concentration in the rear portion of the club head 21.

The stabilizing stay 73 increases the rigidity of the wings  
10 31, 31' further.

By the toe and heel portions 23, 25 and the wings 31, 31' having an essentially L-shaped cross-section and by the cross stays 71, 71' projecting from the bottom portion 35 of the wings 31, 31', is achieved that the mass centre of the club  
15 head 21 is located lower than the centre of the face 27.

The internal side edge 39 of the wings 31, 31' together with the aiming grooves 43, 44, 49, 53 and 57, possibly the side edge portions 78 of the stabilizing stay 73 together with the aiming groove 79 work as aiming means to increase the  
20 precision of stroke.